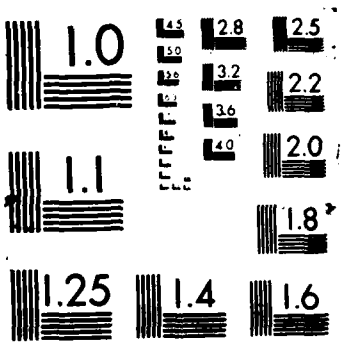
AD-A186 894 SHIPBOARD MEDICAL INFORMATION SYSTEM NEEDS AMONG SURFACE SHIPS(U) NAVAL HEALTH RESEARCH CENTER SAN DIEGO CA C G BLOOD ET AL. 28 AUG 87 NHRC-87-18 1/1

UNCLASSIFIED F/G 5/2 NL


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
4.5
5.0
5.6

DTIC FILE COPY

SHIPBOARD MEDICAL INFORMATION SYSTEM NEEDS AMONG SURFACE SHIPS

AD-A186 094

C. G. BLOOD
D. M. PEEPS-BRAND
W. M. PUGH
J. C. HELMKAMP

REPORT NO. 87-18

DTIC ELECTE NOV 0 9 1987 E

Approved for public release distribution unlimited.

NAVAL HEALTH RESEARCH CENTER
P.O. BOX 85122
SAN DIEGO, CALIFORNIA 92138

NAVAL MEDICAL RESEARCH AND DEVELOPMENT COMMAND
BETHESDA, MARYLAND

87 10 23 019

Shipboard Medical Information System Needs Among Surface Ships*

Christopher G. Blood
Dawn M. Peeps-Brand
William M. Pugh

Medical Information Systems Department

James C. Helmkamp

Occupational Medicine Department

Naval Health Research Center
P. O. Box 85122
San Diego, CA 92138-9174

*Report Number 87-18, supported by the Naval Medical Research and Development Command, Bethesda, Maryland, Department of the Navy, under research Work Unit No. 63706N M0095-005-1053. The opinions expressed in this paper are those of the author and do not reflect the official policy or position of the Department of the Navy, Department of Defense, nor the U. S. Government.

SUMMARY

In addition to normal demands placed on health care units, shipboard medical departments of U.S. Navy vessels must operate in relative isolation and function with crews that have varying levels of expertise. Previous investigations indicated that attrition among hospital corpsmen was related to the administrative burden placed upon them. Automation within medical departments can enhance accuracy of recordkeeping and assist in the delineation of illness and injury trends. Surface ships (Surface Pacific and Air Pacific Fleets) were surveyed to ascertain medical capabilities needed by the senior medical department representatives. Fifteen medical functions were rated as to their perceived need aboard ships. Automated functions most needed were report generator, medical supply inventory, medical reference library, pharmacy support, message formatting, and a daily task inventory. A shipboard medical information system that includes the surveyed functions would greatly assist corpsmen and physicians by providing more time for primary health care.

Accession For
NTIS GRA&I
DTIC TAB
Unannounced
Justification
By
Distribution/
Availability Codes
Dist | Avail and/or Special
A-1

DTIC COPY INSPECTED

Shipboard Medical Information System Needs Among Surface Ships

Introduction

U.S. Navy surface ships and submarines have medical departments that vary in function from first aid stations to floating hospitals. In addition to the needs of other health care facilities, medical departments on ships must deal with two complicating factors. The effects of isolation on these floating or submerged facilities are exacerbated by differences in the level of expertise of senior medical department representatives. Though ship-to-ship and ship-to-shore capabilities reduce the impact of isolation, there are instances when transmissions must necessarily be kept to a minimum. The Senior Medical Department Representative (SMDR) aboard ships may vary from hospital corpsmen to medical officers, and this range reflects a wide array of medical skills that may or may not be present. In addition to primary health care functions, the SMDR is responsible for many administrative duties such as report writing, intra-departmental training, and medical supply inventory. The conditions unique to the shipboard environment coupled with the ancillary responsibilities are particularly onerous to medical department personnel.

Automation within medical departments of Navy vessels is technically feasible and would provide shipboard medical personnel with needed support. The heavy burden of administrative tasks on the independent duty corpsmen has been documented[1]. Relief from this burden and the concomitant problem of attrition among corpsmen can be achieved through medical department automation[2]. Given that 53 percent of the corpman's time is consumed by administrative duties[1], computerization of the myriad of reports the corpsman is responsible for would surely allow more time to be spent providing health care.

In addition to report generation, other automated functions have been recommended for incorporation into a shipboard medical information system[3]. The proposed modules specifically dealt with supply inventory, training logs and schedules, medical tickler, task inventory, and diagnostic aids. The impetus for the current survey being administered to ascertain perceived auto-

mation needs among senior medical department representatives was the aforementioned investigations[1,3].

Method

The survey was developed at Naval Health Research Center (NHRC) in San Diego and mailed to 173 ships of the Surface Pacific and Air Pacific Fleets to determine the automation needs within the shipboard medical departments. Information requested by the survey included current automation status, size of medical department, average weekly patient load and disposition, reports desired automated, and a rating of fifteen proposed functions. The rating scale with the proposed functions are listed below.

Using this scale (G=great need for automation, S=some need for automation, N=no need for automation, D=doesn't apply to this ship), check the following areas for need of being automated.

G	S	N	D	
				PATIENT RECORDS
				MEDICAL SUPPLY INVENTORY
				GENERATING REPORTS/LOGS
				COMPILING FORM LETTERS/MESSAGES
				MEDICAL DECISION MAKING
				PERIODIC TRAINING FOR MEDICAL DEPARTMENT STAFF
				GENERAL MEDICAL TRAINING FOR CREW
				PREVENTATIVE MEDICAL TRAINING FOR CREW
				MEDICAL REFERENCE LIBRARY (instructions, references, manuals)
				DAILY TASK INVENTORY (inspections, immunizations, reports, etc.)
				PHARMACY SUPPORT (drug interactions, auditing controlled drugs)
				QUALITY ASSURANCE FUNCTIONS
				TRIAGE MANAGEMENT
				STATUS BOARDS
				PATIENT TRACKING/ACCOUNTING

Surveys were returned to NHRC from 106 ships of the Surface Pacific and Air Pacific fleets. Ships that are represented in the subsequent analyses are from the following types: Ammunition, n=6; Amphibious, n=12; Battleship, n=1; Carrier, n=5; Cruiser, n=12; Destroyer, n=13; Frigate, n=32; Landing, n=8; Minesweeper, n=4; Oiler, n=3; Repair, n=1; Salvage, n=3; Store, n=4; Support, n=2.

Results

Description of Respondent Ships.

Among the fourteen ship types there was no significant difference in proportions of ships returning surveys. The number of medical personnel aboard ships varied from 1 to 40. The mean, median, and modal number of personnel were respectively 5.5, 3.0, and 3.0. The senior medical department representative ranged from Hospital Corpsman First Class (E6) to Captain (06). Frequency distributions of medical personnel and SMDR rank are shown in Table 1 and Table 2.

Reported average weekly patient load varied greatly among shipboard environments. Patient load was found to be as low as 10 (salvage ships) and as high as 500 (carriers). The mean, median, and mode for weekly patient load were 63, 40, and 40 respectively. Mean dispositions of these patient loads were as follows: 93 percent returned to full duty, 4 percent returned to limited duty, and 2 percent were sent to sick bay/sick in quarters.

Current medical department automation consists of SNAP (Shipboard Non-tactical ADP Program) and/or personal microcomputers. The SNAP system is a non-weapons related computer system used inside and outside the medical department for generating rosters and tallies of administrative variables (blood types, immunizations, etc.). More than one-half of the survey respondents have SNAP aboard, while less than one-third presently have microcomputers. Table 3 shows the joint distribution of these two variables.

Automated Report Generation

One area that the medical information system needs survey focused on was report/log generation. Analysis of the data indicated that automation of reports and logs was identified as a need by 95 percent of the survey respondents. Among each ship type, a majority of respondent ships clearly wanted this capability, with the exception of minesweepers (n=3; only one indicated a need).

The SMDR was also queried as to which reports they would most like to see automated. There were requests for automation of reports from every type of

ship. Respondents indicated an average of four reports to this query with automation requested for as many as 19 reports by a single ship.

Pooling the responses to the request to identify needed reports yielded a list of 73 separate reports. Those reports that occurred most frequently, in descending order, were: Monthly Morbidity, Dental Report, TB Report, Bacteriological, Radiation Reports, Controlled Medicinals, Morning Report of the Sick and Injured, Food Service Report, and Accident/Injury Reports. These reports represent only those requests that were received from at least 10 percent of the respondents. It is quite evident that report generation is a high priority among the perceived automation needs of the SMDRs that responded to the survey.

Other Automation Needs

The survey addressed additional automation needs in conjunction with Report and Log generation. Other potential areas of medical department computerization were patient records, medical supply inventory, form letter/message compilation, medical decision making, medical department staff training, medical training for crew, preventive medical training for crew, medical reference library, daily task inventory, pharmacy support, quality assurance functions, triage management, status boards, and patient tracking/accounting. As with report/log generation, each medical department representative could respond to the above functions with one of four options: doesn't apply to this ship, no need for automation, some need for automation, or great need for automation.

Seventy-nine percent of respondents indicated a need for automation of patient records. Among ships claiming no need for computerizing patient records, only minesweepers and fast combat support ships among all types had majorities expressing this position. These results are likely due to the small number of ships responding in these two groups (n=4 and n=2, respectively).

There was almost unanimity in regard to the need for automating medical supply inventory. More than 97 percent of respondents indicated a need; those that didn't never formed a majority among a particular ship type.

Almost as many respondents expressed a need for the capability to compile form letters and format messages as for reports and logs. Ninety-one percent indicated a need; only minesweepers had a majority expressing no need.

The percentage indicating need for a medical decision-making function was relatively low. Sixty-five percent of respondents expressed a need for automation of this function. It was thought that clarification of this capability might have led to different results. Subsequent communications with SMDRs indicated resistance to the notion of relying on a machine to diagnose illnesses and determine treatments; however there were no stated qualms with the use of the computer as a diagnostic or treatment aid.

Demand was high for an automated medical reference library. This function would entail storing instructions, references, and pertinent manuals on disk with cross-referencing for easy and rapid retrieval. Eighty-seven percent of respondents indicated a need for this capability. Another function related to the medical reference library would be computerized Quality Assurance. This capability, which could take the form of interactive video disks and tutorials, was indicated as being needed by 89 percent of survey respondents.

Likewise, results from the survey showed that a pharmacy support function should be considered in the design of a medical information system. Such a function could specify drug interactions and aid in the auditing of controlled drugs; 89 percent of the survey respondents stated a need for pharmacy support.

Also pointed out by the survey results was the need for automated training functions. Eighty-four percent indicated that periodic medical training for medical department staff should be included in a medical information system; 86 percent specified a need for automating general medical training for crew; a preventive medicine training function was indicated as being needed by 85 percent of respondent ships.

Computerization of casualty receiving functions was stated as a need, albeit by smaller percentages than most other functions. It was reasoned that these smaller percentages in specified need (triage management - 57 percent,

status boards - 70 percent, patient tracking and accounting - 74 percent) may reflect the reduced involvement among ships in the casualty receiving process. Therefore the data from amphibious ships, which are most directly involved with casualty functions, were analyzed separately. Although the percentages rose to 58 percent, 83 percent, and 83 percent respectively, the difference between amphibious and other ships was not significant.

The final function that ships were queried about was an automated daily task inventory. This capability could search the system data base and identify which patients are to be seen, why each patient was scheduled, the training sessions planned, and display a list of reports that are due. The daily task inventory was perceived to be needed by 91 percent of the survey respondents.

The proposed automated functions showed varying degrees of perceived need. Table 4 displays percentages of the four levels of need or applicability for each of the 15 proposed capabilities in descending order of overall need. Also shown (Table 5) are the casualty receiving functions among amphibious ships.

Discussion

Though 70 percent of survey respondents presently have some medical department automation (either SNAP or microcomputer), there is still a great demand for further automation. With fuller automation, smaller ships with a medical complement of one to three corpsmen would have more time for actual health care functions, and larger ships with increased medical capabilities would be better able to record and track patient information.

Currently under development is the SNAP Automated Medical System (SAMS). This medical information system is incorporating medical supply functions, report generating capabilities, tickler file information, individual encounter data, some environmental surveillance functions, and training logs and schedules. These capabilities go a long way towards satisfying the needs of hospital corpsmen; however, there are still functions left to be automated to fully meet the medical department requirements of corpsmen and medical officers aboard ships. These needed capabilities include a daily task inventory, medical reference library, pharmacy support, casualty receiving functions, diagnostic and treatment aids, form letter/message compilation, and

quality assurance functions. Also important is the need to enhance the currently proposed report generating capability. Given that reporting differences exist among Type Commands (TYCOMS) and that future reporting requirements will undoubtedly differ, it is of paramount importance that the SMDR be able to customize its own reports. The ability to extract lists or tallies of any variables or combinations of variables is a function that would be beneficial to policy making of shipboard medical units as well as the Navy Medical Department.

The addition of the aforementioned capabilities in conjunction with the capacity to retrieve patient information on an ad hoc basis would greatly enhance the currently proposed shipboard medical information system. Not only will these functions contribute to a higher quality of care, the wealth of information accessible through such a medical system will ensure that these high standards continue to rise.

It should be noted that the results of this survey reflect the perceived automation needs within medical departments under current conditions. These perceived needs are therefore biased toward the demands in a peacetime setting. In times of war the shipboard automation needs will be contingent upon factors that are not readily apparent in noncombat settings. Consequently, it is important that input from authorities familiar with medical requirements and operations during combat be obtained so that casualty care needs are adequately addressed.

TABLE 1

Number of Medical Personnel Aboard Ships in Automation Needs Survey

No. of Medical Personnel	Frequency	Percent
1	8	7.8
2	23	22.3
3	33	32.0
4	8	7.8
5	7	6.8
6	4	3.9
7	4	3.9
8	3	2.9
9	1	1.0
10	1	1.0
11	1	1.0
12	1	1.0
14	1	1.0
16	2	1.9
20	1	1.0
21	1	1.0
31	1	1.0
34	1	1.0
38	1	1.0
40	1	1.0

TABLE 2

Distribution of Rank of Senior Medical Department Representatives Aboard Ships in Automation Needs Survey

Rank	Frequency	Percent
CAPT	1	1.0
CDR	3	2.9
LCDR	1	1.0
LT	23	22.5
HMCS	2	2.0
HMC	54	52.9
HM1	18	17.6

TABLE 3

Combined Status of SNAP System and Microcomputers Aboard Ships in Automation Needs Survey

	MICROS		
	No	Yes	Row Total
SNAP			
Unknown	3	1	4
			3.9
No	25	15	40
			38.8
Yes	44	15	59
			57.3
Column	72	31	
Total	69.9	30.1	

Table 4
PROPOSED MEDICAL FUNCTIONS AND PERCEIVED NEEDS AMONG SHIPBOARD SURVEY RESONDENTS

	Doesn't Apply		No Need		Some Need		Great Need	
	N	%	N	%	N	%	N	%
Patient Records	6	5.7	18	17.0	27	25.5	55	51.9
Medical Supply Inventory	2	1.9	1	.9	7	6.5	98	90.7
Generating Reports/Logs	1	1.0	4	3.8	29	27.6	71	67.6
Compiling Form Letters/Messages	3	2.8	6	5.6	45	42.1	53	49.5
Medical Decision Making	13	12.0	25	23.1	50	46.3	20	18.5
Periodic Training for Med. Dept. Staff	4	3.7	14	13.0	54	50.0	36	33.3
General Medical Training for Crew	3	2.8	13	12.1	60	56.1	31	29.0
Preventive Medical Training for Crew	3	2.9	13	12.5	56	53.8	32	30.8
Medical Reference Library	4	3.7	11	10.2	33	30.6	60	55.6
Daily Task Inventory	2	1.9	7	6.6	18	17.0	79	74.5
Pharmacy Support	5	4.7	7	6.5	33	30.8	62	57.9
Quality Assurance Function	4	3.8	7	6.6	41	38.7	54	50.9
Triage Management	12	11.2	34	31.8	33	30.8	28	26.2
Status Boards	13	12.0	21	19.4	35	32.4	39	36.1
Patient Tracking/Accounting	14	13.0	16	14.8	33	30.6	45	41.7

Table 5
CASUALTY RECEIVING FUNCTIONS AND PERCEIVED NEEDS AMONG AMPHIBIOUS SHIPS IN SURVEY

	No Need		Some Need		Great Need	
	N	%	N	%	N	%
Triage Management	5	41.7	2	16.7	5	41.7
Status Boards	2	16.7	3	25.0	7	58.3
Patient Tracking/Accounting	2	16.7	3	25.0	7	58.3

REFERENCES

1. Nice, D.S., Hilton, T.F. Job Characteristics of Shipboard Independent Duty Hospital Corpsmen. Report No. 86-20, Naval Health Research Center, San Diego, 1986.

2. Naval Health Research Center. Shipboard Independent Duty Corpsmen Study, Briefing Report, November 1985.

3. Helmkamp, J.C., Gunderson, E.K.E., Parson, Wm. Functional Concepts for a Shipboard Medical Information System, Report No. 84-48, Naval Health Research Center, San Diego, 1984.

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS None
2a. SECURITY CLASSIFICATION AUTHORITY N/A	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; Distribution Unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE N/A	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) NHRC Report No. 87-18	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Naval Health Research Center 6b. OFFICE SYMBOL (If applicable) Code 20	7a. NAME OF MONITORING ORGANIZATION Commander, Naval Medical Command
6c. ADDRESS (City, State, and ZIP Code) P. O. Box 85122 San Diego, CA 92138-9174	7b. ADDRESS (City, State, and ZIP Code) Dept of the Navy Washington, D.C. 20372
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Naval Medical Research & Development Command 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c. ADDRESS (City, State, and ZIP Code) Naval Medical Command National Capitol Region Bethesda, MD 20814-5044	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. 63706N PROJECT NO. M00095 TASK NO. 05 WORK UNIT ACCESSION NO. DN246555

11. TITLE (Include Security Classification)

(U) Shipboard Medical Information System Needs Aboard Surface Ships

12. PERSONAL AUTHOR(S)
Blood, C.G., Peeps-Brand, D.M., Pugh, W.M., and Helmkamp, J.C.

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Final	FROM _____ TO _____	1987 August 28	

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	Medical Information Systems, Shipboard Needs, Hospital Corpsmen, Automation, Computerization

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

Senior medical department representatives aboard U.S. Navy ships were surveyed to determine the automation needs of shipboard medical departments. Surveys were returned from 106 medical department personnel representing fourteen types of ships. Fifteen medical functions were rated as to their perceived need. Automated functions most needed were report generator, medical supply inventory, medical reference library, pharmacy support, message formatting, and a daily task inventory. The capability of shipboard medical personnel to customize reports to their specific ships demands would mitigate problems associated with differing report requirements among Type Commands and individual ships. Medical department size and current automation status were also examined.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION Unclassified
22a. NAME OF RESPONSIBLE INDIVIDUAL Christopher G. Blood	22b. TELEPHONE (Include Area Code) 619/225-2071 22c. OFFICE SYMBOL Code 20

DD FORM 1473, 84 MAR 83 APR edition may be used until exhausted
All other editions are obsolete

SECURITY CLASSIFICATION OF THIS PAGE

U.S. Government Printing Office: 1988—607-047

END

12-87

DTIC